

**UNITED STATES DEPARTMENT OF COMMERCE****United States Patent and Trademark Office**

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IN

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/310,256	05/12/99	CHIN	5 TSMC98-574

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IM52/0827

EXAMINER

AHMED, S

ART UNIT

PAPER NUMBER

1746

5

DATE MAILED: 08/27/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/310,256

Applicant(s)

CHIN ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 24 May 2001 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 5/24/01 has over come the objections to the specification and the drawings and also the claim rejection under 35 USC 112, second paragraph. Accordingly, the claim rejection 35 USC 112, second paragraph is withdrawn but the claims 1-20 are still rejected over Blanchard et al (5,221,425).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1- 3 and 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Blanchard et al (USP 5,221,425).

Blanchard et al disclose a method for reducing the foreign particles during a reactive ion etching process by gradually reducing the radio frequency (RF) voltage to a minimum voltage in a series of steps (col.2, lines 19-40 and 60-68).

Blanchard et al also disclose that gradually reducing the RF voltage to zero results in the least amount of foreign matter onto the substrate and the reduction of the power is done by incrementally reducing the power in a series of steps, wherein at least five steps are used to reduce the power to test five groups of substrates for measuring the content of the foreign particles (col.5, lines 34-43 and lines 64-col.6, lines 2).

Blanchard et al further, disclose that the plasma gases can be removed from the chamber by means of a vacuum pump (col.4, lines 48-51).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchard et al (USP 5,221,425).

Blanchard et al discussed in the above paragraph No. 4 but Blanchard et al do not disclose that the reactive ion etch (RIE) chamber could be inductive coupled plasma (ICP) dry-etch chamber. Blanchard et al's method includes gradually reducing the RF voltage applied to the cathode. So, it would have been obvious to one skill in the art to use ICP dry-etch chamber because it would provide the same benefit.

As of claims 7-14, 16 and 17: Blanchard et al disclose at least five steps are used to reduce the RF power for reduction of particles from the plasma chamber (col.5, lines 34-43 and lines 64-col.6, lines 2) but fail to teach the RF power supplied is gradually reduced in a sequence of six steps or in a sequence of N steps. It would have been obvious to one skill in the art to have six steps or N number of steps in the power reduction process because this is an obvious process variation unless applicants show that exactly six steps are critical for the process.

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As of claims 4 and 20, it would have obvious to have a photolithography mask on the Blanchard 's substrate because forming pattern on the silicon wafers or plasma etching of wafer substrates are well known to have photographic mask.

Response to Arguments

6. Applicant's arguments filed 5/24/01 have been fully considered but they are not persuasive. Applicant argues that Blanchard et al do not teach a process of reducing particle count following a dry-etch chamber power-down procedure after the reactive chamber has been used for RIE processing.

In response, examiner states that applicant is more specific than the claims. Examiner also states that Blanchard et al disclose a process for reducing foreign particles on a substrate to be processed, wherein the power is down to zero in such a manner that particle count is reduced at the end of the power-down process. Blanchard et al, further disclose that the power down procedure starts after the etching process (col.5, lines 54-col.6, lines 2). So, Blanchard et al inherently teach that the particle count is reduced in the dry-etch chamber because the substrate is positioned in the chamber.

Applicant, further argues that Blanchard is concerned with reducing particle concentrations on the surface of a substrate during etching process, whereas, the instant invention is concerned with and applies to reducing chamber particle and thereby reducing particle concentrations on the surface of lithographic mask that is positioned on the sample table in the chamber. In response, examiner states that Blanchard et al disclose a similar process to reduce particle count on the surface of a substrate using a power-down procedure in such a manner that the power or the

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voltage is gradually reduced to a minimum value, wherein the power-down procedure is a subsequent process of the RIE processing (see claims 1-4).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-F (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7718 for regular communications and (703) 305-3599 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Shamim Ahmed
Examiner
Art Unit 1746

SA
August 20, 2001



RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700